

COMPOUND COMMINUTED FRACTURE OF PATELLA;
WIRE SUTURES; NECROSIS OF UPPER
FRAGMENT; FINAL RECOVERY WITH
USEFUL LIMB.

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MRS. R., aged 38, was brought in by the ambulance on the night of August 21, 1884, suffering from a compound comminuted fracture of the right patella. In a fit of temporary aberration of mind, she had leaped from the second story window of her residence to the sidewalk below, and it is presumed that in falling she struck her flexed knee against either the sidewalk or some projecting portion of an awning. The ambulance surgeon had applied some naphthalinated jute to the wound, and supported the limb with a back splint. Upon her arrival at the hospital, the house surgeon irrigated the parts with a 1:1000 solution of mercuric bichloride, and, while awaiting my coming, again covered the wound with naphthalinated jute.

I saw the patient several hours after the accident, and upon removing the dressings, found a transverse wound about an inch and a half in length across the anterior surface of the knee, communicating with the joint. The patella was broken into three fragments, the upper half of the bone representing one fragment, the lower half being broken into two unequal parts by a vertical line of fracture, the smaller one of the latter being located at the inner aspect of the limb. Having enlarged the wound sufficiently, it was found that the fibrous structure comprising the anterior coverings of the patella, as well as the aponeurotic expansion of the extensor muscles were completely torn across, and that, further, the irregular shreddy fibres of the upper edge of the rent were intimately adherent to the projecting spiculæ of the roughened fractured surface of the upper fragment. It was only after patient scraping and lifting away of this tissue, by means of the scalpel, that a clean bony surface was obtained for approximation to the lower fragments. I then drilled and wired together the two lower fragments;

these were in their turn each wired to the large upper fragment. The joint was thoroughly irrigated with a 1:1000 solution of mercuric bichloride, and a rubber drain, $\frac{5}{8}$ of an inch in diameter, placed so that its inner extremity projected beyond the capsule at each angle of the incision. The rent in the latter was now closed by a continuous catgut suture, and the wound in the integument as well. Iodoform was dusted along the line of incision and wound, and cushions of naphthalinated wood-flour applied, secured in place with gauze bandages. A trough-shaped splint, made of coarse wire netting, well padded with cotton batting, was prepared, in which the limb was placed and bandaged.

At the end of fourteen days the dressings were removed, for the sole purpose of removing the rubber drains. No rise of temperature, pain, or other indication for disturbing the dressings occurred, and the use of non-absorbable drains alone necessitated the taking down of the limb at this time. The parts were aseptic, and the wound healed by first intention. The rubber drains were removed, strands of catgut substituted therefor, and the parts re-dressed. Immediately following this dressing, the patient developed an attack of dysentery, which, in addition to her already weakened intellect, made it exceedingly difficult to keep the discharges from the bowels from soiling the bed and dressings; however, this was fairly well accomplished, and for fourteen days longer the dressings were allowed to remain undisturbed, at the end of which time it was found that the openings from which the drainage tubes had been removed, at the previous dressing, had closed entirely, the projecting ends of the catgut strands, which had been substituted for the rubber tubes, coming away upon the cushion of wood-flour. It was discovered, at this time, that the line of union had parted directly over the most prominent portion of the patella for about $\frac{3}{8}$ of an inch, and through the opening thus formed a necrosed condition of the upper fragment was found to exist.

On November 24, the upper fragment was found to be sufficiently detached to warrant an attempt at its removal. This was accomplished without much difficulty, after enlarging the opening, when it was found that the joint was perfectly closed by a thick fibrous capsule underlying the necrosed portion, connected to the upper margins of the now firmly united two lower fragments, and forming a strong ligamentous bond of union between the quadriceps extensor tendon above, and what remained of the patella below. The fragment removed was about the size of an English walnut. The cavity filled up rapidly, and the patient was discharged from the hospital, March 8, 1885, with a useful limb and considerable motion at the knee-joint.

At the time of writing (May, 1885), she goes about without perceptible limp, ascends and descends stairs in the usual way, and can flex her limb to a right angle.

REMARKS. I desire to call especial attention to the fact that this case was treated in an antiseptic manner from the very start. I think it was Esmarch who said that the fate of a wounded man depended in a great measure upon the practitioner who first touched him; and by this he meant that, other things being equal, the question of patient's life and quick restoration to health was often made to turn upon the fact of his wound being treated upon antiseptic principles, or not, in the very beginning. The ambulance is the proper place, above all others, for mercuric bichloride, carbolic acid and sterilized absorbent pads, and the sooner this fact is recognized and acted upon the better for our showing of good results, in compound fractures particularly.

In an able article upon this subject by Macewen, of Glasgow,¹ especial attention is directed to the entanglement of the soft parts between the fragments, and the very great probability of this complication being the principal cause of failure of union after transverse fracture of this bone. In the present case, a very good illustration of this state of affairs was found to exist, upon closely examining the parts.

The method of wiring claims attention for a moment. Stout platinum wire was used, silver wire of sufficient thickness not being at hand at the time. The two lower fragments were first wired together, and their upper margins were then sutured to the lower margin of the upper fragment by two wire sutures, one for each lower fragment. Thus the bone was placed in its normal relations as nearly as possible, and there maintained. Instead of hammering the ends of the wire down into the bone, as recommended by Lister,² I adopted a procedure, suggested by myself, for disposing of the ends of the wire, after bone-suturing. It consists of simply turning in the ends of the wire between the surfaces of bone.

¹ *London Lancet*. 1883. Vol. ii., page 847.

² "Antiseptic Excision of the Knee-Joint." *Proceedings Medical Society of the County of Kings*. 1880. Page 235.

The suturing of the torn edges of the capsule is a matter of some importance. In the earlier cases reported, no particular stress was laid upon this point. In an article upon this subject, Dr. F. C. Fuller, of New York,¹ advocates this step. I have endeavored to attain this in this class of cases, although it is no easy matter always to accomplish it. Upon the general principle of always attaching, when practicable, tissue to like tissue in the closing of wounds, this is a desirable point to care for, independently of the advantage gained by an early closure of the joint, and its consequent immunity from irritation from without, the latter always a source of danger.

It will be noticed that, in this case, drainage was accomplished by means of large sized rubber drainage tubes, and the latter were allowed to remain in position for a much longer period of time than that usually considered safe or desirable. Yet, no harm resulted; on the contrary, the perfect drainage obtained was of itself of the greatest safety. The sinuses left by the drainage tubes closed completely, in spite of the fact that they were occupied by strands of catgut, which were substituted for the rubber drains, at the time of the second dressing. I am inclined to think that too much stress has been laid upon the evil results supposed to arise from the presence of non-absorbable drains in the tissues, and not enough importance given to the necessity of using large drains in joint operations. In my experience, they certainly have seemed to be the safest, and, whether absorbable or non-absorbable, they should not be smaller in calibre than $\frac{5}{8}$ of an inch in diameter, and should have thick, stout walls. It has been my practice for some time past, in cases where it is necessary to drain a joint, to use a large rubber tube at the first dressing, and to remove this, if all goes well, at the next subsequent dressing, and substitute for it a bundle of coarse catgut strands. As a rule, the dressing at which this is done suffices to complete the cure. It may be argued that, if catgut were used at the first dressing, the healing process might be accomplished under one dressing. I would reply that the risk of tension in the joint and its deplorable consequences are too great to be undertaken for the sake of escaping the slight inconveniences incident to an extra

¹ *Medical Record*. New York. Vol. xxiv., page 675.

dressing; for no capillary drain, however complete, can be as effectual as a closed trough or conduit, as exemplified by a firm walled drainage tube. Even when they have been left in for a period of fourteen days, as in the present instance, they have given rise to no irritation, and after their removal rapid closure of the sinuses has resulted. I am, therefore, constrained to offer a plea for large drainage tubes in joint cases, and the leaving of them undisturbed for longer periods of time than has heretofore been considered expedient.

The death and necessity for removal of the upper fragment was in no measure due to any failure of the antiseptic treatment, but was due, on the contrary, to the injury which the periosteum received at the time of the accident. König has met with a similar experience,¹ and Wahl is credited with another case, although the statement is first made that it was the lower fragment that perished. The occurrence of this sequel has led to the placing of the cases above quoted in the list of those having an unfortunate termination.² Surely, if the final result was such as occurred in the case herewith reported, it was an error to so place them. Death of one or more of the fragments, following the operation is probably an uncommon occurrence, although when it does occur, it need not necessarily invalidate the success of the operation.

The strength and completeness of the ligamentous connection between the upper margins of the lower fragments (which latter, by the way, had completely united, and by bone) and the quadriceps extensor tendon, was remarked at the time of the removal of the necrosed upper fragment. It reminded one forcibly of the ligamentous union found upon dissecting old cases of fracture of the patella.

¹ Statement made in Editorial, *Med. News.* Phila. Dec. 1, 1883. Page 603.

² Statement made in Editorial, *Med. News.* Phila. Dec. 8, 1883. Page 630.